Abstract

Title: Effect of the load and recovery time on a physiological response in sport rock climbers

Objectives: The main purpose of this study was to assess the inluence of various types of climbing loads on a physiological response in sport rock climbers.

Methods: Seven experienced (8 to 9+, UIAA - Union Internationale des Associations d'Alpinisme) sport climbers (age 25,4 ± 7 years, body 64,8 ± 6 kg, height 175,8 ± 5,3 cm) were subjected to climbing test until exhaustion, which involved three excercises that included various types of load: continuous, intermittent with 30s load and 30s rest periods (test 30/30) and intermittent with 90s load and 90s rest periods (test 90/90). All subjects refrained from exercising at least 48h between each testing. The monitored variables were performance of climbing steps, heart rate (HR), oxygen consumption (VO_2), minute ventilation (VE), energy expenditure (EE) and blood lactate (LA).

Results: Peak values of monitored variables show that a climbing intensity was similar among all tests (HR_{peak} 168 ± 11 to 172 ± 7 bites/min, VO_{2peak} 35,2 ± 4,7 to 40,3 ± 5,3 ml/kg/min, LA 4,1 ± 1,1 to 4,9 ± 1,4 mmol/l). EE was in average 9,0 to 9,8 kcal. Subjects climbed longest (4min 45s ± 37s) in the test 30/30 (six climbers achieved maximum defined time 10 x 30s), whereas total climbing time to exhaustion was shortest (1min 53s ± 15s) in continuous test. EE (excluding oxygen debt) of the test 30/30 averaged 44,9 ± 7,1 kcal, a third less expenditure was found in the test 90/90 and the lowest expenditure climbers had in the continuous test (18 ± 0,9 kcal).

Conclusion: During intermittent climbing with shorter sections of load and recovery, climbers, unlike other types of load, did not exhaust themselves, although the physiological response was similar. Therefore, subjects could sustain the similar intensity of climbing for a longer time. Intermittent climbing with 30s sections of load and recovery appears to be applicable to enhance specific climbing endurance. Unspecific aerobic training allows faster recovery during rest sections of the intermittent load.

Keywords: aerobic performance, recovery, sport climbing